

HCC4073B/81B/82B HCF4073B/81B/82B

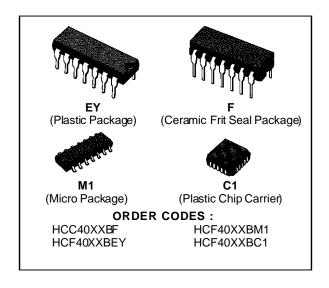
AND GATES

4073B TRIPLE 3-INPUT AND GATE
4081B QUAD 2-INPUT AND GATE
4082B DUAL 4-INPUT AND GATE

- MEDIUM SPEED OPERATION tplh = 85ns (typ.); tphl = 65ns (typ.) AT 10V
- QUIESCENT CURRENT SPECIFIED TO 20V FOR HCC DEVICE
- 5V, 10V, AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100nA AT 18V AND 25°C FOR HCC DEVICE
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDECTEN-TATIVE STANDARD N° 13A, "STANDARD SPE-CIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"

DESCRIPTION

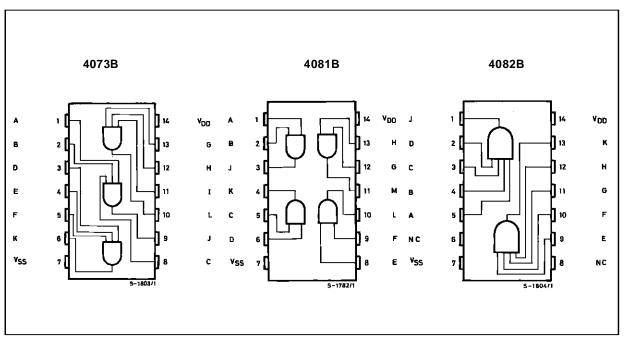
The HCC4073B, HCC4081B and HCC4082B (extended temperature range) and the HCF4073B, HCF4081B and HCF4082B (intermediate temperature range) are monolithic integrated circuits avail-



able in 14-lead dual in-line plastic or ceramic package and plastic micro package.

The HCC/HCF4073B, 4081B and 4082B AND gates provide the system designer with direct im-

CONNECTION DIAGRAM



June 1989 1/10

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DD} *	Supply Voltage : HCC Types HCF Types	- 0.5 to + 20 - 0.5 to + 18	V V
Vi	Input Voltage	- 0.5 to V _{DD} + 0.5	V
I ₁	DC Input Current (any one input)	± 10	mA
P _{tot}	Total Power Dissipation (per package) Dissipation per Output Transistor for T_{op} = Full Package-temperature Range	200 100	mW mW
Top	Operating Temperature : HCC Types HCF Types	- 55 to + 125 - 40 to + 85	°C
T _{stg}	Storage Temperature	- 65 to + 150	°C

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for external periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage: HCC Types	3 to 18	V
	HCF Types	3 to 15	V
V_{I}	Input Voltage	0 to V _{DD}	V
Top	Operating Temperature : HCC Types HCF Types	- 55 to + 125 - 40 to + 85	ڻ ي

STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

			T	est Con	dition	s	Value								
Symbol	mbol Parameter		٧ı	٧o	I ₀	V_{DD}	TL	ow*		25 °C	25 °C		gh [*]	Unit	
			(V)	(V)	(μA)	(V)	Min.	Max.	Min.	Тур.	Max.	Min.	Max.		
ΙL	Quiescent		0/ 5			5		0.25		0.01	0.25		7.5		
	Current	HCC	0/10			10		0.5		0.01	0.5		15		
		Types	0/15			15		1		0.01	1		30		
			0/20			20		5		0.02	5		150	μΑ	
		HCF Types	0/ 5			5		1		0.01	1		7.5		
			_	Types	0/10			10		2		0.01	2		15
		Туроо	0/15			15		4		0.01	4		30		
V _{OH}	Output High	h	0/ 5		< 1	5	4.95		4.95			4.95			
	Voltage		0/10		< 1	10	9.95		9.95			9.95		V	
			0/15		< 1	15	14.95		14.95			14.95			
V _{OL}	Output Low Voltage	5/0		< 1	5		0.05			0.05		0.05			
		10/0		< 1	10		0.05			0.05		0.05	V		
			15/0		< 1	15		0.05			0.05		0.05		

^{*} $T_{Low} = -55^{\circ}C$ for **HCC** device : $-40^{\circ}C$ for **HCF** device.

The Noise Margin for both "1" and "0" level is : 1V min. with $V_{DD} = 5V$, 2V min. with $V_{DD} = 10V$, 2.5V min. with $V_{DD} = 15V$.



^{*} All voltage values are referred to V_{SS} pin voltage.

^{*} T_{High} = + 125°C for **HCC** device : + 85°C for **HCF** device.

STATIC ELECTRICAL CHARACTERISTICS (continued)

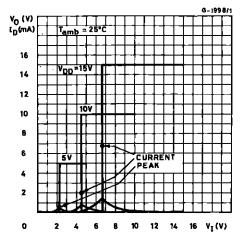
			Т	est Con	dition	s	Value							
Symbol	Parameter		٧ı	٧o	I ₀	V _{DD}	ΤL	ow*		25 °C		T Hi	gh [*]	Unit
			(V)	(V)	(μA)	(V)	Min.	Max.	Min.	Тур.	Max.	Min.	Max.	
V _{IH}	Input High			0.5/4.5	< 1	5	3.5		3.5			3.5		
	Voltage			1/9	< 1	10	7		7			7		V
				1.5/13.5	< 1	15	11		11			11		
V_{IL}	Input Low			4.5/0.5	< 1	5		1.5			1.5		1.5	
	Voltage			9/1	< 1	10		3			3		3	V
				13.5/1.5	< 1	15		4			4		4	
I _{OH}	Output		0/ 5	2.5		5	- 2		- 1.6	- 3.2		- 1.15		
	Drive Current	HCC	0/ 5	4.6		5	- 0.64		- 0.51	- 1		- 0.36		
	Current	Types	0/10	9.5		10	- 1.6		- 1.3	- 2.6		- 0.9		
			0/15	13.5		15	- 4.2		- 3.4	- 6.8		- 2.4		mA
			0/ 5	2.5		5	- 1.53		- 1.36	- 3.2		- 1.1		1117 (
		HCF Types	0/ 5	4.6		5	- 0.52		- 0.44	- 1		- 0.36		
			0/10	9.5		10	- 1.3		- 1.1	- 2.6		- 0.9		
			0/15	13.5		15	- 3.6		- 3.0	- 6.8		- 2.4		
I _{OL}	Output		0/ 5	0.4		5	0.64		0.51	1		0.36		
	Sink Current	HCC Types	0/10	0.5		10	1.6		1.3	2.6		0.9		
	Current	1) poo	0/15	1.5		15	4.2		3.4	6.8		2.4		mA
			0/ 5	0.4		5	0.52		0.44	1		0.36		1117 (
		HCF Types	0/10	0.5		10	1.3		1.1	2.6		0.9		
		.) 00	0/15	1.5		15	3.6		3.0	6.8		2.4		
I _{IH} , I _{IL}	Input Leakage	HCC Types	0/18	Any In	nut	18		± 0.1		±10 ⁻⁵	± 0.1		± 1	μΑ
	Current	HCF Types	0/15	Ally III	Put	15		± 0.3		±10 ⁻⁵	± 0.3		± 1	μΛ
Cı	Input Capa	citance		Any In	put					5	7.5			pF

DYNAMIC ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}C$, $C_{L} = 50 pF$, typical temperature coefficient for all V_{DD} values is $0.3\%/^{\circ}C$, all input rise and fall times = 20 ns, $R_{L} = 200 k\Omega$)

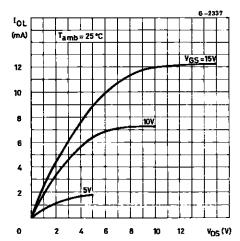
Symbol	Parameter	Test Conditions			Unit		
Symbol	Farameter		V _{DD} (V)	Min.	Тур.	Max.	Unit
t_{PHL}, t_{PLH}	Propagation Delay Time		5		125	250	
			10		60	125	ns
			15		45	90	
$t_{TLH},\;t_{THL}$	Transition Time		5		100	200	
			10		50	100	ns
			15		40	80	

 $T_{Low} = -55^{\circ}\text{C}$ for **HCC** device : -40°C for **HCF** device. $T_{High} = +125^{\circ}\text{C}$ for **HCC** device : $+85^{\circ}\text{C}$ for **HCF** device. The Noise Margin for both "1" and "0" level is : 1V min. with $V_{DD} = 5V$, 2V min. with $V_{DD} = 10V$, 2.5V min. with $V_{DD} = 15V$.

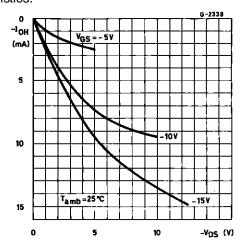
Typical Voltage and Current Transfer Characteristics.



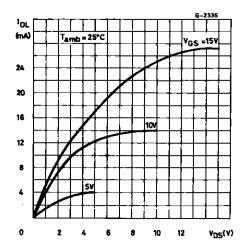
Minimum Output Low (sink) Current Characteristics.



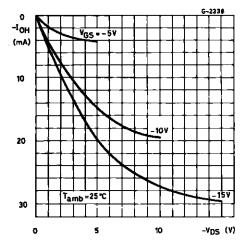
Minimum Output High (source) Current Characteristics.



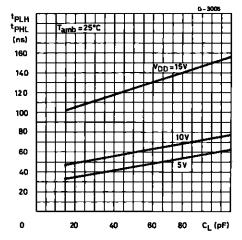
Typical Output Low (sink) Current .



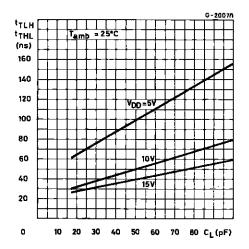
Typical Output High (source) Current Characteristics.



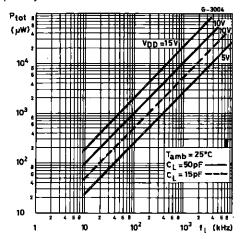
Typical Propagation Delay Time vs. Load Capacitance.



Typical Transition Time vs. Load Capacitance.

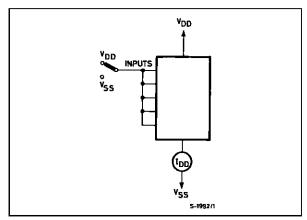


Typical Dynamic Power Dissipation per Gate vs. Frequency.

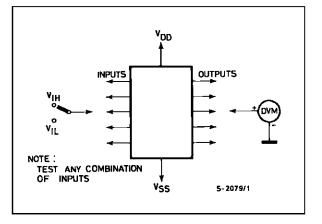


TEST CIRCUITS

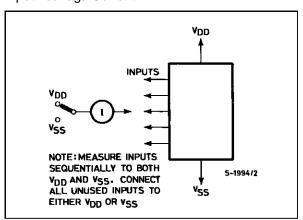
Quiescent Device Current.



Input Voltage.

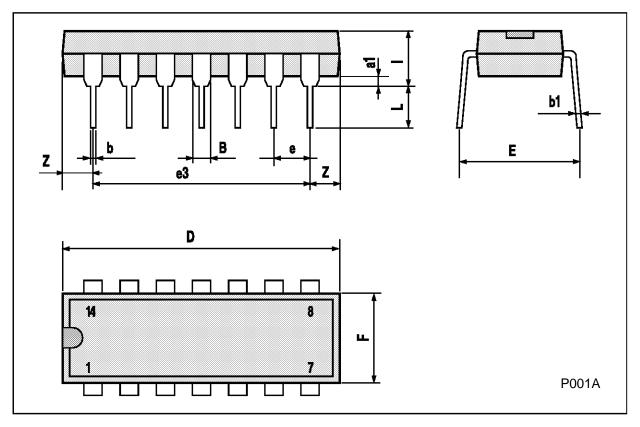


Input Leakage Current.



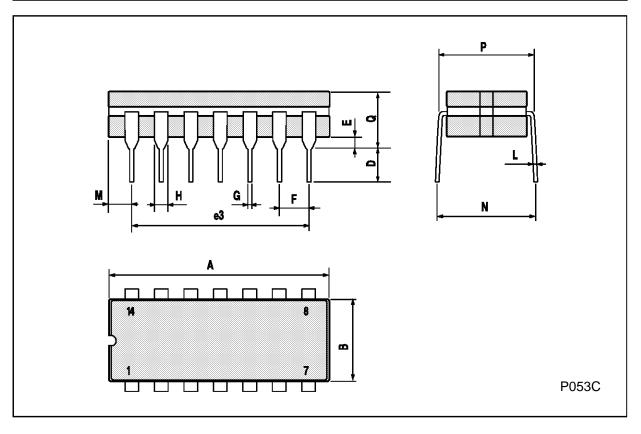
Plastic DIP14 MECHANICAL DATA

DIM.		mm		inch				
Dini.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.		
a1	0.51			0.020				
В	1.39		1.65	0.055		0.065		
b		0.5			0.020			
b1		0.25			0.010			
D			20			0.787		
E		8.5			0.335			
е		2.54			0.100			
e3		15.24			0.600			
F			7.1			0.280		
I			5.1			0.201		
L		3.3			0.130			
Z	1.27		2.54	0.050		0.100		



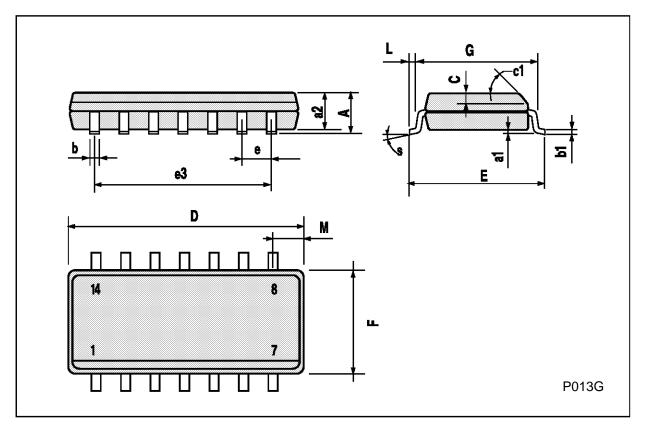
Ceramic DIP14/1 MECHANICAL DATA

DIM.		mm			inch	
Diiii.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
А			20			0.787
В			7.0			0.276
D		3.3			0.130	
Е	0.38			0.015		
e3		15.24			0.600	
F	2.29		2.79	0.090		0.110
G	0.4		0.55	0.016		0.022
Н	1.17		1.52	0.046		0.060
L	0.22		0.31	0.009		0.012
М	1.52		2.54	0.060		0.100
N			10.3			0.406
Р	7.8		8.05	0.307		0.317
Q			5.08			0.200



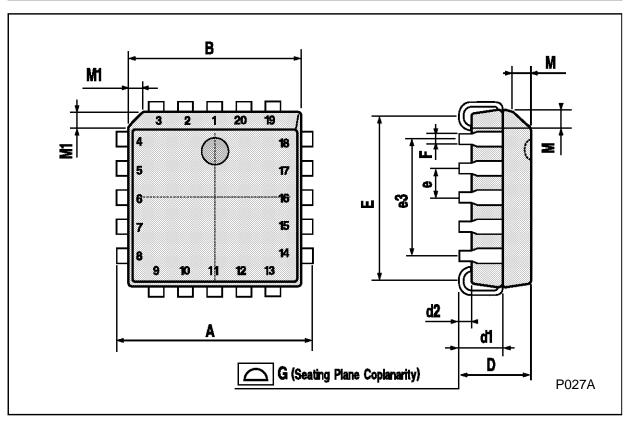
SO14 MECHANICAL DATA

DIM.		mm			inch	
DIIVI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
Α			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
С		0.5			0.019	
c1			45°	(typ.)		
D	8.55		8.75	0.336		0.344
Е	5.8		6.2	0.228		0.244
е		1.27			0.050	
e3		7.62			0.300	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
М			0.68			0.026
S			8° (ı	max.)		



PLCC20 MECHANICAL DATA

DIM.		mm		inch				
Dim.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.		
А	9.78		10.03	0.385		0.395		
В	8.89		9.04	0.350		0.356		
D	4.2		4.57	0.165		0.180		
d1		2.54			0.100			
d2		0.56			0.022			
Е	7.37		8.38	0.290		0.330		
е		1.27			0.050			
e3		5.08			0.200			
F		0.38			0.015			
G			0.101			0.004		
М		1.27			0.050			
M1		1.14			0.045			



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